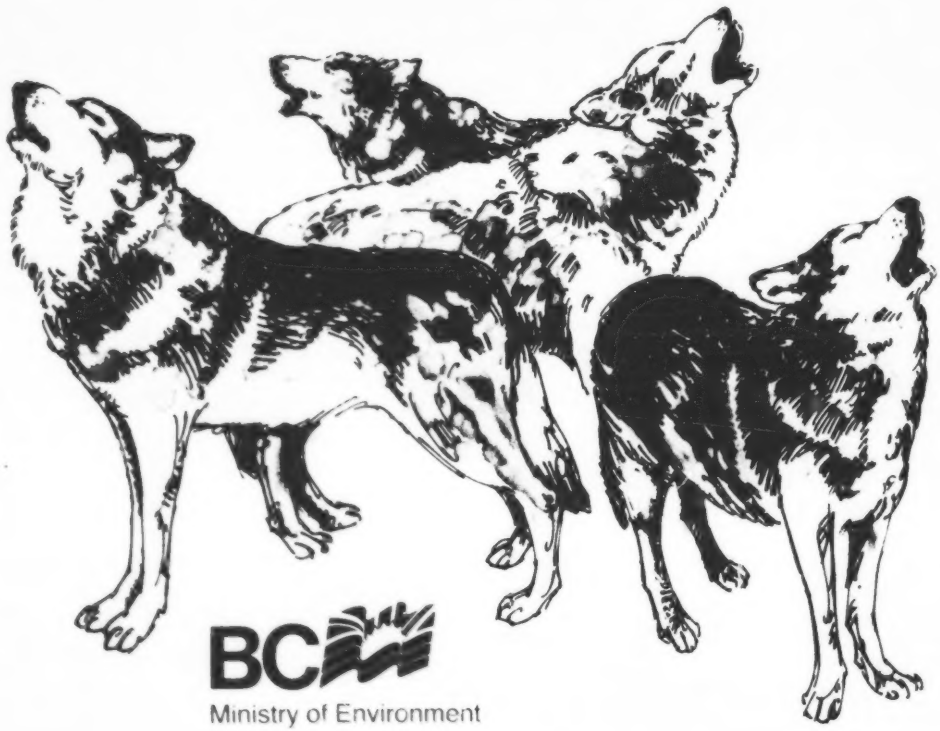
WOLF MANAGEMENT IN BRITISH COLUMBIA

Protecting Predator & Prey



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Illustrations by Monty Hui.

Ministry of Environment

"Of all the native biological constituents of a northern wilderness scene, I should say that the wolves present the greatest test of human wisdom and good intentions."

—Paul L. Errington, 1967
'Of Predation and Life'

On a moonlit night in the mountains of northern British Columbia a wolf howl pierces the still autumn air. To campers at the edge of a lake the sombre song is as welcome as the warmth of their fire. It's a reminder that they are guests in the wolf's domain, a sound they'll remember and listen for each time they gather round a campfire in untamed places.

British Columbians are among those fortunate North Americans who can travel into the wilderness with reasonable hope of hearing or seeing wolves. As intriguing as they are elusive, wolves arouse the curiosity of anyone who tramps the backwoods. A few people venture out specifically to find them. Most must be satisfied to catch an unexpected glimpse of a wolf vanishing into the forest, or to hear the melancholy howling of a pack before a hunt.

The wolf, *Canis lupus*, North America's largest wild dog, once inhabited the continent from the Mexican plateau to Greenland. It occupied almost all habitats and terrain, from coastal timberlands to open valleys and rolling hills. But, like the wolves of Europe and Asia, the North American wolf fell victim to man's enterprise — ranchers and farmers who transformed forests to raise cattle and crops, industrialists who sought the mineral wealth of the New World, and merchants who built towns to supply settlers. As habitats supporting the wolf's prey animals disappeared, so too did the prey. In some areas the wolf was compelled to take fewer natural prey and more domestic livestock, a situation which put the predator in constant conflict with man.

As the nations of North America developed, the wolf was extirpated from many of its traditional territories. Today a few remain in Mexico, but the wolf is virtually extinct throughout its historic southern range. Wolves survived the onslaught, however, in Canada and parts of the north-central United States, and they are still plentiful in the northern portion of the continent. In British Columbia they are absent from parts of the Kootenays and the Thompson-Okanagan region, and from urban sections of the Lower Mainland, but are common in northern B.C., through much of the central Interior, and on Vancouver Island. No comprehensive inventory of British Columbia's wolf population has ever been made — and probably would not be possible — but an informed estimate made in 1979, based on observation and some known densities, put the late winter population at around 6,000. There are many indications that the population has increased since, dramatically so in some areas.

It may have been because development came later to British Columbia that our wolves were spared the fate met by wolves in the south. In the early part of this century the attitude toward the wolf in B.C. was as antagonistic as everywhere else in North America. Wolves were regarded as vermin, wilderness vagrants that preyed on livestock and the game animals needed to fill the larders of pioneering families. Even before the turn of the century, in 1870, when B.C. was still under colonial rule, a bounty was offered on wolves. For decades they were trapped, shot and poisoned

indiscriminately throughout the province.

In 1947 a Predator Control Division was formed under the Provincial Game Commission. A part of their function was to develop a systematic program to control wolves. Five predatory animal hunters were hired, and the bounty on wolves was increased to $40 in the cattle-ranching Kamloops, Lillooet and Cariboo Districts. Elsewhere in the province the bounty remained at $25. Experimentation with cyanide, strychnine and Compound 1080 (sodium monofluoroacetate) led to the establishment of baiting stations in 1950. Baits laced with 1080 were air-dropped onto frozen lakes and rivers where they were less likely to attract animals other than wolves. The use of baiting stations expanded through the early Fifties until as many as 2,100 stations were created in a single year.

The inefficient bounty system was abandoned in 1955 by the B.C. Game Commission — the first wildlife agency in North America to do away with a wolf bounty.

Meanwhile the widespread poisoning program carried out by the Predator Control Division had been highly successful in reducing wolf numbers. At the same time it had become evident that, although canines were much more susceptible to 1080 poisoning than other animals, the high dosage and broadcast methods employed at the time had resulted in the death of much non-target wildlife. Consequently, in 1961 the large scale poisoning of wolves in wilderness areas was terminated, and baiting continued only in livestock raising areas and some heavily hunted areas. The provincial Predator Control Division was disbanded in 1963.

Through the 1960s a growing appreciation of ecological principles, plus new knowledge of wolves, fostered recognition of the wolf as an intriguing and valuable inhabitant of the wilderness, one member of an intricate wildlife community in which all of the members evolved together. Appreciation of the wolf's role as a predator and as a social animal grew in the later 1960s and early '70s. In many minds the wolf became ennobled as a symbol of unspoiled wilderness and freedom. British Columbia was one of the first North American jurisdictions to view the wolf in a more favorable light, and moved to end the era of unchecked persecution. In 1966 the wolf was designated a big game animal to be protected through provincial hunting regulations, laws which help prevent indiscriminate killing. Two years later hunting of wolves on Vancouver Island was closed, and was not re-opened until 1977, when the once scarce Vancouver Island wolf had become so

numerous as to present a problem. Hunting bag limits had been imposed in some parts of the province in 1969, and extended to other areas in 1970, 1971, and 1974. The wolf was no longer seen as vermin to be shot on sight.

With this new conservationist attitude toward the wolf came a new set of policies and objectives for wolf management in British Columbia. Today the Ministry of Environment is committed to managing wolves as an integral part of wild ecosystems and as big game animals and furbearers. The present management plan describes five objectives, in the following words:

"The first objective is to maintain viable populations of wolves in wilderness areas . . . the Wildlife Branch will take action to prevent this species from being extirpated or otherwise becoming endangered in B.C. through the actions of man. Wolf populations will be allowed to fluctuate naturally in wilderness areas, with modest hunting and trapping seasons, unless evidence shows they should be reduced or increased.

"The second objective is to provide opportunities for people to listen to and observe wolves in their natural habitat . . .

"The third objective is to control wolves in well established livestock management areas to reduce livestock losses. Wolves and livestock are often not compatible; wolves can and occasionally do cause serious local livestock losses . . .

"The fourth objective is to control wolves on a site specific basis where the main objective is to maintain another wildlife (prey) population at a desired

level. High wolf numbers may threaten the existence or prevent the recovery of isolated populations of prey species, especially if habitat and weather conditions are poor or wolf numbers are high. Control may be undertaken in such circumstances if investigations indicate it is necessary in order for a prey population to begin to recover.

"The fifth objective is to provide for the hunting and trapping use of wolves . . . approximately 600 wolves are taken annually by hunters and trappers in B.C."

Natural mortality among wolves is high, and usually a direct result of declines in prey populations. Where prey species are low, wolves may die from malnutrition, starvation, cannibalism, parasites and disease. A wolf needs more than three kilograms of food a day to breed successfully. If less is consumed during winter the result is poor pup production and survival. Some scientists estimate that from birth to the first winter nearly half of the pups in a population may die. Of the remaining pups, more than half could die from the first to second winters. Wolves that trespass into the hunting grounds of other packs often suffer crippling or fatal injuries from interterritorial disputes. Deaths are also caused by trapping, hunting and poisoning. All causes of mortality in wolves must be considered by wildlife managers attempting to maintain healthy wolf populations.

Providing opportunities for people to hear and watch wolves in their natural environment is a management objective that may not easily be achieved. The elusiveness of wolves limits casual sightings. However, some parks, ecological reserves, nature conservancies or wildlife management areas may become known as places to observe the fascinating habits of wolves. The fortunate few who have an opportunity to study them are invariably captivated by their complex social interactions and the noticeable affection of pack members for one another.

Packs usually consist of five to eight members, including a dominant breeding pair, pups of the year, yearlings, and occasionally other related adults. Normally the dominant pair breeds in late February or early March, to produce litters of four to seven pups. The pups are born blind in late May or June and are cautiously guarded by the mother until they're weaned at about eight weeks. During that time the mother and young are fed by other pack members that regurgitate food at the den or carry it in from kills. By autumn the pups begin to travel with the others. Packs may travel territories of 130 to 1 500 square kilometres, depending on the terrain, the season, and abundance and location of prey. When young wolves are dispersing to form new packs and establish territories they may travel up to 300 kilometres. Wolves often move 30 or 40 kilometres a day in search of their prey, which may be moose, caribou, deer, mountain sheep or goats, elk, beaver or a variety of small animals. In coastal areas wolves have been known to feed on intertidal life and fish.

In recent years wildlife biologists in B.C., Alaska, the Yukon and elsewhere have taken a keen interest in the wolf. It has become the subject of numerous studies, most of which focus on the wolf's relationship with prey species. Many of these studies disprove the suggestion that wolves feed mainly on unfit animals — old, sick or crippled prey which are certain to die from other causes. Wolves are selective only in the sense that they will take the most vulnerable prey, regardless of the prey animal's physical condition. Healthy adults are taken when opportunities arise. Juveniles are prime targets in spring and summer.

Biologists today are also questioning the common belief that the animals taken by predators in the course of a year are all surplus to the population — that if wolves don't kill them, something else will, and a natural 'balance' will be maintained. Recent studies suggest natural systems are constantly changing as living things interact with the environment and each other. The relative numbers of prey and predators continually shift. Severe weather, uncontrolled hunting or the destruction of the prey animals' habitat can thoroughly upset the so-called balance between wolves and their prey, and abetted by disease, parasites and starvation, these influences at times can depress prey numbers below a critical threshold level. At that point the number of animals that succumb from all causes exceeds the recruitment of young into the adult prey population.

The wolves are then capable of preventing recovery of the prey population, and may bring about further declines even though environmental conditions favourable to the prey animals are restored. When ungulate populations fall to critical levels, wolf predation appears capable of maintaining the downward slide alone. Eventually the wolves themselves begin to suffer as their food supply steadily diminishes; predators and prey may continue to co-exist, as they have throughout history, but will be present in minimal numbers for many years after. There will be few animals to study, to hunt or to observe. In this equation of checks and balances, only two factors are readily controllable by wildlife managers to prevent such a situation developing. They are hunting and predation.

To test the effects of wolf predation on survival of caribou calves, the Ministry of Environment conducted an experiment from 1978 to 1980 in the Horseranch Range of northern B.C. Wolves were reduced over three years, while wolves on Level Mountain, another northern caribou range, were left alone. During the three years, caribou on Level Mountain steadily declined, while caribou numbers in the Horseranch increased. Calf recruitment in the Horseranch was three to four times as high as it was before wolves were killed. The Horseranch study and other research has put a new perspective on the seriousness of wolf predation on ungulate populations.

When ungulate herds are reduced to low levels they do not, as many people believe, all bounce back in two or three years. Only if circumstances change to give prey species a chance to improve are they able to recover. It make take 25 to 50

years for large prey populations to rebuild if left alone. Elk and moose, primary targets for wolves, don't breed until they're two years old. Elk rarely produce more than one calf; moose may twin if good feed is available. The reproductive capacity of wolves is much higher.

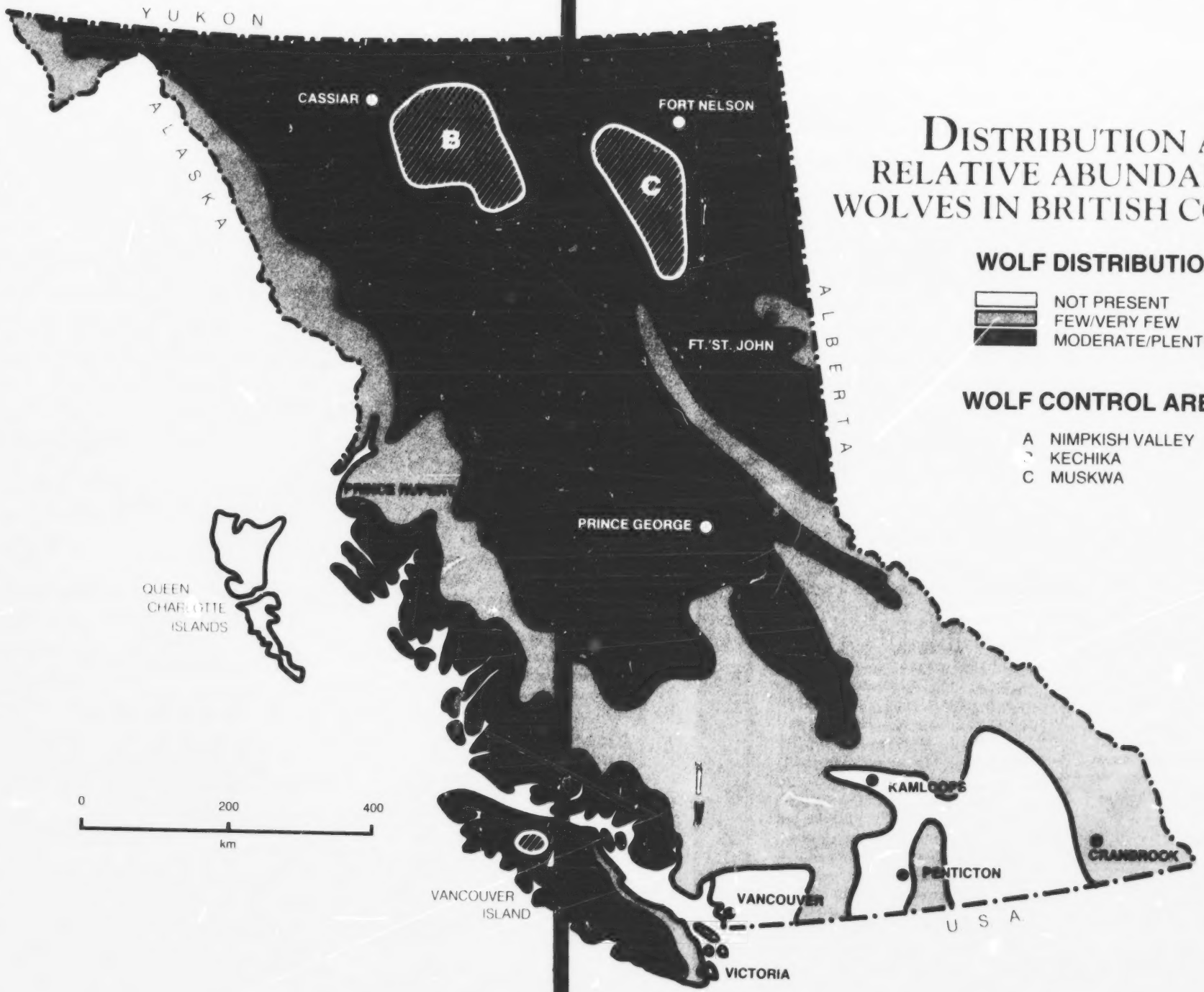
After B.C.'s 'persecution era' faded, wolf populations, supported by a new abundance of prey, rapidly increased, particularly in the north. By the end of the 1970s wolf densities in the north averaged about one for every 150 square kilometres, and since have reached four times that level, among the highest wolf densities ever recorded in North America. Meanwhile, caribou, moose, elk and mountain sheep have severely declined in most parts of the north. Hardest hit are juveniles; the proportion of young animals to mature females is no longer high enough to sustain existing populations. When the Ministry of Environment went ahead with wolf control programs in the northeast, some ungulate populations were dropping by 50 percent every three years.

Evidence gathered from the Horseranch and other studies prompted the Ministry of Environment to launch the experimental Kechika Enhancement Project. The Kechika Valley, 250 kilometres west of Fort Nelson, is potentially a highly productive ungulate area, with little development and poor access. It is one of the northern areas where ungulate herds were seriously declining in the face of exploding wolf populations, despite its potential. A program was initiated in 1981 to test the effect of wolf

control on moose, Stone sheep and caribou, and also to determine the value of prescribed burning as a way of improving sheep ranges. The plan was to try to double ungulate populations by temporarily reducing the unusually high wolf densities to one wolf for every 260 to 390 square kilometres.

Experience in Alaska, and more recently in British Columbia, shows a wolf removal area of 15 000 to 20 000 square kilometres is necessary to prevent outside wolves from moving into the core soon after wolves have been removed. As a result the Kechika removal area, originally 7 800 km^2, was expanded to 18 700 square kilometres. Survival of ungulates within the Kechika wolf removal area is being compared with survival in outside areas where the wolves are being left alone. Since wolf control began, survival of big game animals in the removal area has substantially improved, while ungulate populations in outlying areas have continued to decline.

The same year the Kechika project started, the Ministry of Environment launched a study of the effects of wolf control on blacktailed deer in the Nimpkish Valley, an area of about 2 000 square kilometres on northern Vancouver Island. At one time the Nimpkish provided 10 percent of the total annual provincial deer harvest. The Vancouver Island wolf at that time was so scarce that it was given complete protection as a near-extinct subspecies. The wolves enjoyed full protection until 1977, when hunting was again permitted. In that scant decade the Vancouver Island wolf



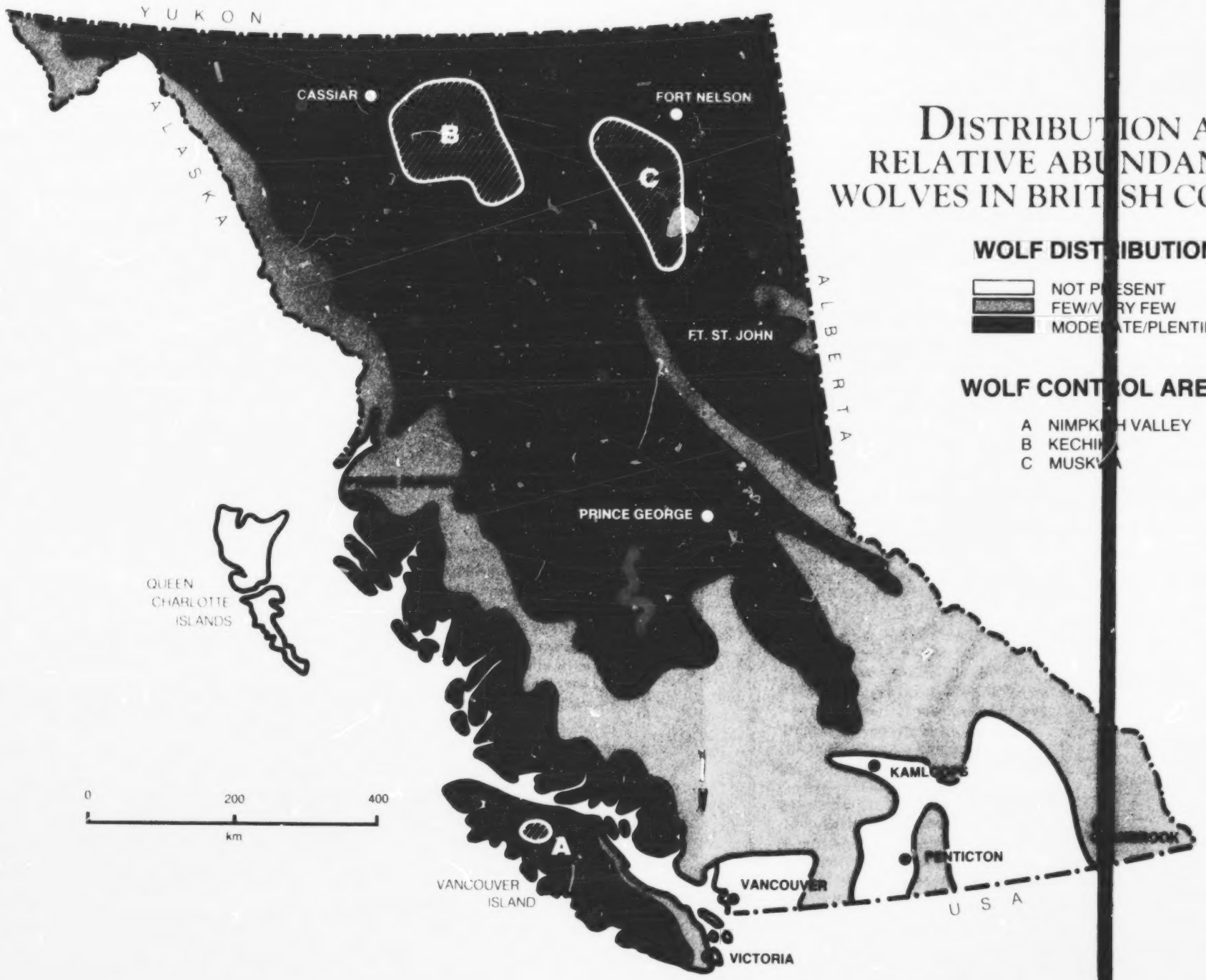
DISTRIBUTION AND RELATIVE ABUNDANCE OF WOLVES IN BRITISH COLUMBIA

WOLF DISTRIBUTION

- NOT PRESENT
- FEW/VERY FEW
- MODERATE/PLENTIFUL

WOLF CONTROL AREAS

- A NIMPKISH VALLEY
- [illegible] KECHIKA
- C MUSKWA



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WOLF CONTROL AREAS

A NIMPKISH VALLEY
B KECHIKA
C MUSKWA

had become common. Deer populations, in contrast, dropped by more than 75 percent between 1976 and 1982.

Under the Nimpkish study plan, wolves were left alone in one area, and another was established as a wolf-removal zone. Since the study began survival of fawns has improved significantly in the removal zone, while there has been little change in the area where wolves were left alone.

With encouraging results from studies such as the Horseranch and the Kechika, it was decided to begin a wolf control and ungulate enhancement program in the Muskwa Valley, an important big game area about 80 kilometres southwest of Fort Nelson. Like the Kechika, the Muskwa was suffering severe ungulate declines and rapid increases in wolf numbers. But unlike the Kechika, the Muskwa project was launched as an operational program, not an experiment. Severe and continuing decline of ungulates appeared inevitable in the Muskwa, despite the fact that ranges had been enhanced through prescribed fire and food was abundant. The declines in populations of moose, Stone sheep and elk appeared to be directly linked to quickly growing wolf populations. By 1984 wolf densities in the Muskwa had reached one wolf for every 26 square kilometres, a four-fold increase since 1977. Caribou, the least plentiful of the four ungulate species, were down to about a third of their 1970 numbers, but seemed to be gradually increasing, perhaps because there were too few of them to attract severe predation by the wolves.

The Muskwa project was designed to reduce densities to one wolf for every

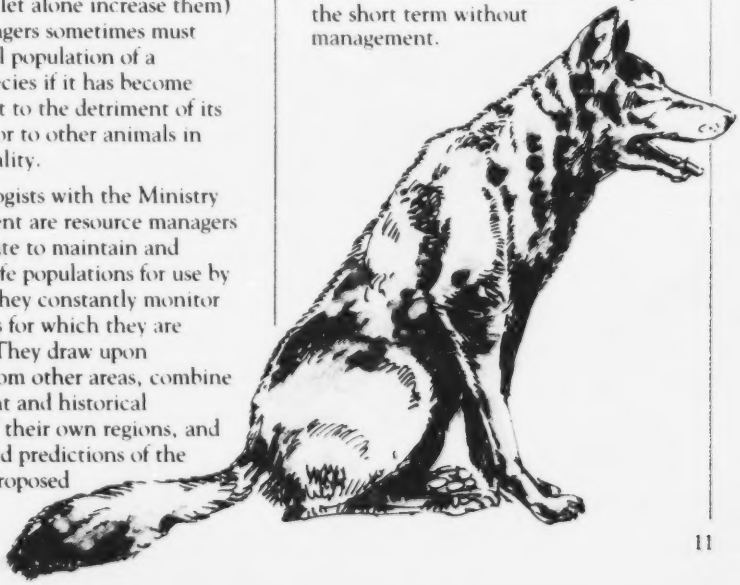
260 to 390 square kilometres, in a three year period, over an area totalling 19 000 square kilometres. The program is assessed annually to determine the response of the ungulates. The long-term plan is to maintain wolf densities at one wolf for every 155 square kilometres. Ungulate populations should double, and will be maintained within historic levels by future management measures which may necessarily include limited periodic wolf control. Relatively stable numbers of both wolves and ungulates will be the aim.

Wolves in the Muskwa and Kechika were shot from helicopters, an effective and humane way of removing wolves from open country with good snow accumulations. The aerial shooting of wolves nevertheless prompted a public outcry against wolf control. It was suggested that inadequate study had been done before embarking on the Kechika and Muskwa programs (even though the Kechika was designed as a test project), and that only a few northern guide-outfitters would benefit by the production of more game to attract foreign trophy hunters. Others labelled the shooting of wolves from helicopters as cruel and unnecessary.

Many flatly stated they were opposed to the killing of any wildlife, and believed nature should be allowed to run its course without interference from man. In essence, the philosophy and policies which govern wildlife management in the province were called into question.

The management of wildlife in British Columbia is based on government policies which recognize the use of wildlife by 'consumptive users' such as trappers, hunters, and guides, and by 'non-consumptive' users, those who observe, photograph or study wild animals. Many people belong to both groups. Wild animals, like forests, are a renewable resource, and are managed to meet demand put on the resource by the public. Indications are that there is a public demand to increase wildlife in some areas, for both hunting and viewing. In order to maintain stable wildlife populations (let alone increase them) wildlife managers sometimes must reduce a local population of a particular species if it has become overabundant to the detriment of its own habitat or to other animals in the same locality.

Wildlife biologists with the Ministry of Environment are resource managers with a mandate to maintain and protect wildlife populations for use by the public. They constantly monitor the territories for which they are responsible. They draw upon experience from other areas, combine it with current and historical knowledge of their own regions, and make reasoned predictions of the outcome of proposed programs. In the Muskwa there was ample background information from the Horseranch and the Kechika, and from similar programs in Alaska, to warrant launching a wolf control program with good expectation of halting declines and improving ungulate populations. As with any new venture, a degree of uncertainty exists, but the risks are minimal. The wolves will not be entirely eradicated, and immigration from outlying territories added to reproduction will soon bring the wolf population to normal densities. Meanwhile the ungulates will have been given a period of freedom from excessive predation. It is hoped that the time gained will be sufficient for ungulate populations to recover and sustain themselves and possibly expand, providing enough game to support both controlled hunting and moderate predation by wolves. The aim is to produce greater and healthier populations of all species — ungulates and wolves — than would develop in the short term without management.



Once objectives have been decided for a particular wildlife area there are several ways of going about the task of management. If, for example, the objective is to preserve rare or endangered species, their habitats can be legally designated critical wildlife areas to protect them from damage. For more widespread and abundant species, important habitat can be protected from agricultural, industrial or urban development through land use agreements. New populations can be established by transplanting breeding stock to vacant habitats. In the Kechika, for example, 59 Rocky Mountain elk were transplanted in 1984 from Elk Island National Park in Alberta to augment a tiny herd of elk naturally occurring there. Further transplants could be carried out in the future to provide sufficient seed stock for the production of sizeable elk herds. If ungulate populations are declining because of heavy predation, however, there is little point in transplanting new animals unless the predation problem is being dealt with.

A commonly-accepted method of improving ungulate populations is to enhance their winter ranges through prescribed fire. Controlled burning is carried out to remove trees which have grown beyond reach of browsing animals, or to kill old, unproductive shrubs, and thin evergreens that are poor forage. Burning recycles nutrients locked in old vegetation and stimulates the growth of succulent young shrubs, grasses and other plants that provide good feed. Large areas have been burned in the Muskwa to improve ranges for elk and sheep. Moose and sheep ranges in the Kechika also have been enhanced through prescribed fire. Again, like transplanting, prescribed burning may be a wasted effort if ungulate populations are steadily diminishing due to excessive unchecked predation.

Where hunting is a planned use of wildlife, regulations are set to ensure the harvest is kept in balance with the productivity of the wildlife management area. Hunters may be compelled to be selective. Hunting seasons on male, female, and young ungulates may be manipulated to maintain productive populations. In areas such as the Nimpkish, Muskwa, or Kechika, where it's essential that animals surviving predation be preserved to breed, only the hunting of adult males is permitted. Cows and does are protected. Relatively fewer males than females are needed to produce the next generation, and as long as enough prime males are left to service the females, the hunting of a limited number has virtually no affect on reproduction within a herd. Many critics have a mistaken impression that trophy hunting (which is usually concentrated on male animals) is always detrimental to ungulate populations, but properly controlled hunting, whether for meat or trophies, ensures sufficient breeding stock remains to perpetuate the herds. So, while all hunting could be prohibited where game herds are declining from wolf predation, the prohibition would have little or no affect on the decline, which would continue at virtually the same rate, with or without the regulated hunting of male ungulates. Unlike hunters, wolves kill ungulates year-round, taking whatever prey is

available — juveniles, males or females. Young animals, because of their vulnerability, are frequently killed before they reach breeding age, reducing the number of ungulates which could replenish the population. Where acceptable ratios of predator to prey exist this is not serious, but when predation is abnormally high and prey populations have fallen below a critical level, it is serious indeed. When it appears probable that predators are controlling the ungulate populations and are causing continuing declines, as in the Muskwa and Kechika, it is only good management to carry out wolf control intensively until the prey begin to increase. Periodic moderate control in following years may be required to maintain an acceptable balance between predator and prey.

In British Columbia predator control to reduce wolf populations is stringently regulated by government-approved policies. Wolves may be removed when they threaten or kill livestock or people; if they interfere with wildlife research projects; if they cause serious ongoing reductions in desirable prey species; or if they prevent the enhancement of prey species numbers, where enhancement is an objective.

A 1984 provincial policy on the control of problem predators to protect livestock states that wildlife conservation officers may deny wolf control to farmers whose faulty or negligent animal husbandry practices have encouraged predators to harass their livestock. If a properly operated farm is subject to confirmed predator problems, the farmer preferably obtains the assistance of a conservation officer, or he may attempts to destroy the animals causing the difficulty himself.

Under the provincial policy concerning the control of wolves for the benefit of other wildlife, there are several criteria which must be met before control can be undertaken. First, there must be reasonable expectation of a good response from the prey species, and second, the habitat must be capable of supporting their increased numbers. Third, the prey animals must be utilized by hunters, trappers or non-consumptive wildlife users to justify the control program. Finally, but of equal concern, the long-term survival of predators within the control area must be ensured.

To control wolves successfully for the purpose of increasing ungulates, it is desirable to remove entire packs, rather than individual animals. If only subdominant members of a pack are killed, the dominant pair, normally the only members of the pack to breed, remains to breed again. If the dominant pair is taken, subdominant pack members may breed, maintaining the existing pack and possibly splitting away to create new packs.

In open country with good snow cover an efficient method of removing wolves is to shoot them from helicopters. Tracks can be spotted easily from the air and followed to the pack. Many people who object to the aerial gunning of wolves for control purposes confuse the operation with sport hunting, but there is nothing recreational about it: wolf management is the objective. Hunting wildlife from an aircraft without special authorization is, in fact, strictly prohibited under the provincial Wildlife Act.

Field experience indicates aerial gunning is one of the most humane ways of killing wolves when it is necessary to do so. When a wolf is spotted the animal is put under stress for only two or three minutes, the average duration of a chase. No animals have been wounded and left to die; nearly all die instantly.

Because wolves travel great distances on their hunting circuits, and are difficult to stalk, they are hard to hunt on the ground. A farmer who encounters wolves on a kill may be able to shoot one or two, but shooting from the ground is a poor method of controlling wolves when entire packs must be removed. Aerial gunning, however, cannot be done in all types of terrain. It is impossible in heavily-forested areas like Vancouver Island's Nimpkish Valley. Wolves killed for the Nimpkish study were trapped, then shot.

In forested areas poison is an effective method of taking wolves. In past decades strychnine, cyanide and sodium monofluoroacetate (commonly known as Compound 1080), have been used to kill wolves. Strychnine and cyanide, however, if not properly used, can

indiscriminately destroy a variety of animals. Compound 1080 is 'species-specific', meaning members of the canine family are much more susceptible to it than other animals. When properly administered a small dose of Compound 1080 will kill a wolf or coyote but is harmless to most other species. Under a licence issued by the Provincial Pesticide Control Branch, certain employees of the Ministry are permitted to use Compound 1080 to control wolves for agricultural purposes. The licence stipulates a total of 6.5 grams of 1080 in a maximum of 400 baits may be used in one year over the entire province. Baiting methods designed to minimize danger to non-target wildlife are employed. No other poison is presently used to control wolves in B.C., and no one in B.C. is presently licensed to use Compound 1080 for ungulate enhancement programs.

Poisons were widely used to kill wolves in the era when the wolf was consiuered a verminous nuisance. Their use today without a licence is illegal. Some ranchers, perhaps frustrated by current restrictions, have called for a return of wolf bounties in British Columbia, but bounties have never been a dependable method of reducing wolf numbers in a controlled way. They

reward the indiscriminate killing of any wolves in any place, whether or not the animals are causing trouble.

Relocating unwanted wolves is frequently suggested as an alternative to killing them. Capturing and relocating live wolves on the scale necessary to effect a reduction in wolf population densities over a large area is simply impractical, physically and economically. Wolves are wary of traps and, apart from the high cost entailed, it would be virtually impossible to entice entire packs into live traps. Moreover, relocating even one or two wolves raises other problems. Introducing wolves from an outside area to a location already occupied by wolves inevitably results in territorial disputes which upset the social structure of the established packs. There is also danger of transporting parasites and diseases with the transplanted wolves. And finally, if suitable habitat that has no resident wolves is found, there remains the question of the acceptance of the wolves by any human inhabitants. In some places, relocated wolves have been shot on sight.

Many who oppose wolf control programs suggest there is a government plan to exterminate the wolf; that there has been a return to the days of wholesale slaughter when all wolves were condemned. This suggestion ignores the fact that wolf control is currently being carried out in only three parts of the province, while wolves inhabit or have access to all wilderness and rural areas of Vancouver Island and mainland B.C., and recently they have been extending their range. In most areas they are not a serious detriment to game populations and ungulate numbers are adequate to support both wolf predation and hunting. Over most of the province problem wolves are being removed only when their removal is necessary to protect livestock or ensure human safety.

Opponents of wolf reduction programs tend also to overlook the fact that the benefits of maintaining wolf populations, albeit at an acceptable balance with prey species, are recognized in provincial management programs. These benefits are economic, recreational and aesthetic.

There are benefits to be gained economically from both hunting and wildlife viewing. Hunting is a major recreational pursuit in B.C., as well as a sizeable industry. Between 150,000 and 175,000 resident hunters in B.C. pay nearly $2 million a year for their basic licences, and in excess of $4 million more for limited entry applications and licences on specific animals. Nearly 4,000 non-resident hunters, who in B.C. must hunt with licensed guides, pay more than $1 million in licence fees. Studies indicate that B.C. resident hunters spend more than $80 million a year to practice their sport. Non-resident hunters spend another $13 million.

Certainly these economic returns from hunting are not all dependent upon wolf control, but in the northeast, which economically is almost totally dependent on natural resources, thirteen guiding enterprises operate within the wolf control areas. They provide employment for numerous assistants to guide hunters,

photographers and other wildlife observers. In the Muskwa hunter demand for some ungulate species exceeds the supply. Potentially, the Muskwa could meet a significant part of the total provincial hunter demand. It has been estimated that hunters currently spend more than $700,000 a year to hunt there. With the improved game populations and enhanced opportunity for recreational hunting that will follow wolf control, that figure could increase substantially.

There is also much to be gained in aesthetic and non-hunting recreational benefits as a result of the current wolf control projects in the northeast. The Alaska Highway runs through the Muskwa. It is a route which is becoming increasingly popular among travellers from across North America and aboard. To many, British Columbia is one of the few remaining places in the world where wild animals can be seen frequently and in sizeable numbers, but that reputation can only be sustained by good management. The hunter's interest in wildlife is shared with hikers, canoeists, naturalists, photographers, artists and others for whom a journey up the Alaska Highway represents a chance to see moose, sheep, bears and other animals at close range. Wolves, elusive and mystical in the annals of international folklore, are especially attractive because they are so seldom seen. Their allure has already been proven in Ontario's Algonquin Park, where visitors gather for 'wolf-howling nights', evenings when they howl into the darkness to elicit responses from nearby wolves. For many, it's the highlight of a vacation.

The decision to manage the wildlife of B.C. was made long ago. Attractive though it might seem to leave nature to run its course, the presence of man cannot be ignored. Our human species is here, it is ubiquitous, and whether for good or ill, we influence the course of ecological events today, even in the most remote wilderness of British Columbia. It is incumbent on us to exercise our stewardship of wildlife responsibility, and to apply new knowledge in our management programs as it becomes available. It would be poor management indeed to stand by idly and permit valued wildlife populations — whether predator or prey — to decline unnecessarily.

Managing an area to maintain abundant populations of ungulates sometimes means controlling wolf numbers, but control does not imply eradication of the wolf as a species. The days of indiscriminate poisoning and wholesale slaughter are gone. We have learned to appreciate the value of all species. Modern wildlife management policies can and should be adjusted to reflect the changing wishes of society, but they must always be based on an understanding of the environment, and ourselves. Through well-founded, ecologically sound management we will continue to ensure the abundance and long-term survival of ungulates, wolves, and all wildlife in British Columbia.

BOOKS ABOUT WOLVES

If you would like to read more about wolves and wolf management, the following publications will be of interest:

1. *The World of the Wolf* by Rutter & Pimlott, Lippincott, New York 1968.
2. *Wolves of Minong: their vital role in a wild community*, by Durward L. Allen, Houghton Mifflin, 1979.
3. *Ecology of the Timber Wolf in Algonquin Provincial Park*, by Pimlott, Shannon and Kolenosky, Ontario Dept. of Lands & Forests , 1969.
4. *Gray Wolf in North America: a preliminary report*, by Ronald M. Nowak, U.S. Bureau of Sport Fisheries and Wildlife, 1974.
5. *Wolf Ecology and Prey Relationships on Isle Royale*, by Rolf O. Peterson, U.S. National Park Service, Scientific Monograph no. 11, 1977.
6. *Wolves in Canada and Alaska: their status, biology and management*, ed. by Ludwig N. Carbyn, Canadian Wildlife Service, report series no. 45, 1983.
7. *The Wolf: the ecology and behavior of an endangered species*, by L. David Mech, The Natural History Press c. 1970.